

hopes that before long not only every medical officer of health and every school teacher, but every man and woman who knows what is needed, will join its ranks. Thus will be formed that body of enlightened public opinion which is the moving power in every reform worked, in every advance made by nation, district, or parish, and thus the gospel of physical culture and healthy environment may win its way to every British home. No more patriotic work can be imagined, even though "the foes be they of our own household."

#### NOTES.

THE council of the Geological Society of London has decided to award the medals and funds this year as follows:—Wollaston medal to Dr. J. J. Harris Teall, F.R.S.; Murchison medal to Mr. Edward John Dunn, of Melbourne; Lyell medal to Dr. Hans Reusch, director of the Geological Survey of Norway; Bigsby medal to Prof. J. W. Gregory, F.R.S.; Wollaston fund to Mr. H. H. Arnold-Bemrose; Murchison fund to Mr. H. L. Bowman; and Lyell fund to Mr. E. A. Newell Arber and Mr. Walcot Gibson.

ST. MARGARET'S BAY, Dover, where great falls of cliff frequently occur, was the scene of another landslide on Tuesday, January 10, when an enormous slice of the cliff, estimated by the coastguard at about a quarter of a million tons, fell into the sea. The fall occurred a little to the eastward of the bay, where the cliff is about 250 feet high. When the fall took place, about 9.30 a.m., it is said that a very sharp earth tremor was felt throughout the village, and was at first believed to be an earthquake. A further fall occurred at noon. As the result of these landslips a gap about 200 feet wide and 50 feet deep appears in the cliff. The débris at the foot of the cliff covers a large area with some very large fragments of rock. The mass is 20 feet or 30 feet high, and extends seawards about a quarter of a mile.

WE learn from the *Times* that an International Archaeological Congress will be opened at Athens by the Crown Prince of Greece on April 7. The opening meeting will be held in the Parthenon, and M. Carapanos, the Minister of Public Instruction, will address the members of the congress. The director of Greek antiquities and the directors of the foreign schools will give an account of the progress of archaeological research in Greece. The congress will be divided into seven sections:—(1) classical archaeology; (2) prehistoric and oriental archaeology; (3) excavations, museums, and preservation of monuments; (4) epigraphy and numismatics; (5) Byzantine archaeology; (6) instruction in archaeology; (7) geography and topography.

A SLIGHT earthquake shock which lasted a few seconds was felt at Gibraltar on January 7, at 5 a.m. No damage was done. The disturbance was also felt in the Spanish towns of Algeciras, Campamento, and San Roque. At La Linea there were two severe shocks, each lasting about five seconds, the first occurring at 4.40 a.m., and the second at 4.52 a.m.

ON Tuesday next, January 17, Prof. L. C. Miall will begin a course of six lectures at the Royal Institution on the "Structure and Life of Animals." The discourse on Friday, January 20, will be delivered by Sir James Dewar on "New Low Temperature Phenomena," and on January 27 by Dr. E. A. Wilson on "The Life of the Emperor Penguin."

WE regret to see the announcement of the death of Mr. G. W. Hemming, K.C., in his eighty-fourth year. In addition to contributions extending over many years to various magazines and periodicals, he was the author of a "Differential and Integral Calculus," which appeared in 1848, and also of a work entitled "Billiards Mathematically Treated" (1893), of which a second edition was recently published.

THE death is announced of Mr. Robert Harris Valpy at the advanced age of eighty-five. Although a keen geologist, he published very little, but he made a very fine collection of fossils from the Devonian rocks of North Devon, and his assistance was acknowledged in the late Mr. Etheridge's work on the "Physical Structure of West Somerset and North Devon" (1867). Mr. Valpy was the author of "Notes on the Geology of Ilfracombe and the Neighbourhood," published anonymously by Twiss and Sons, of Ilfracombe.

THE first award of the Henry Saxon Snell prize will be made this year by the Royal Sanitary Institute. The prize was founded to encourage improvements in the construction or adaptation of sanitary appliances, and is to be awarded by the council of the institute at intervals of three years. The first prize, which will consist of 50*l.* and a medal of the institute, is offered in the year 1905 for an essay on "domestic sanitary appliances, with suggestions for their improvement." Essays must be delivered on or before March 30, addressed to the secretary of the Royal Sanitary Institute, 72 Margaret Street, W.

THE Association for Maintaining the American Women's Table at the Zoological Station at Naples and for Promoting Scientific Research by Women announces the offer of a third prize of 200*l.* for the best thesis written by a woman, on a scientific subject, embodying new observations and new conclusions based on an independent laboratory research in biological, chemical, or physical science. The theses offered in competition are to be presented to the executive committee of the association, and must be in the hands of the chairman of the committee on the prize, Mrs. Ellen H. Richards, Massachusetts Institute of Technology, Boston, Mass., before December 31, 1906. The prize will be awarded at the annual meeting in April, 1907.

THE death is announced of Mr. Beauchamp Tower, who was associated for some years with Mr. W. Froude, F.R.S., in the experiments made for the Admiralty on the models of ships and on full-sized vessels and engines of the Navy, from which experiments much of the present knowledge of the scientific design of ships has been derived. While working as a consulting engineer, says the *Times*, Mr. Tower developed several ingenious inventions, notably a machine to carry out Mr. Spencer Deverell's idea of obtaining work from wave motion, the well known "spherical" steam-engine, largely employed for some years where high rotary speeds were needed, a centrifugal pump revolution indicator for ships, and a gyroscopic steady platform for guns at sea, all of which afford good examples of originality and scientific acumen. He also undertook for the Institution of Mechanical Engineers, and carried to a successful issue, an extremely complete series of experiments on friction, by which much new knowledge on the subject was gained.

LONDONERS probably began to realise that the electrification of the "underground" railways was nearing completion when, last week, a partial electrical service was started on the section of the lines running from Baker Street to Harrow and Uxbridge. This marks the first step in the change which will be carried out by degrees

over the whole system, the electrical trains being at first run in place of some only of the regular trains, their numbers being increased until eventually the complete service is electrical. When this has been effected, and the steam trains entirely displaced, the cleaning of the stations and tunnels will be taken in hand; it is not until this is complete that the public will derive the full benefit of the alteration, so it is to be hoped that no difficulties will be experienced to cause delay. It has been no small undertaking to prepare everything for the conversion of these lines, and the actual change itself must necessarily be carried out with care, especially as it has to be effected without interruption of the traffic.

M. H. BOURGET, of the University of Toulouse, writes to ask what is the form of the surface of a fowl's egg, and if precise measures have been made of eggs in order to determine whether the shape is constant and approaches that of any known geometrical figure. In reply to this inquiry, Prof. G. H. Bryan, to whom the matter was referred, remarks:—"I believe it is generally recognised that the shape of the meridian section of an egg is most approximately a Cartesian oval, that is, a curve given by the equation  $ar_1 + br_2 = c$ , where  $r_1$  and  $r_2$  are distances from two fixed points. For  $a=b$  this becomes an ellipse, but with  $a$  and  $b$  unequal we get a figure with one end more rounded and one more pointed, very like an egg. But anyone who tried to find mathematical equations for the curves occurring in the forms of organic life would have a difficult task, especially if he were to tackle the Diatomaceæ. It should also be remembered that the number of curves which have an equation is infinitely small compared with the number of curves that cannot be so represented."

THE annual report of the Russian Geographical Society for 1903 has only just reached us. Among the scientific explorations accomplished during the year we notice the explorations of Lake Balkhash by M. L. S. Berg, of Lake Kosogol by M. V. S. Elpatievsky, of Lake Ladoga by M. J. M. Shokalsky, and of various lakes in European Russia, as also of Lake Gokcha, by several students under Prof. D. N. Anuchin. M. V. I. Lipskiy has continued to study the flora of Central Asia, in connection with his forthcoming work on this subject, and has made for this purpose interesting journeys in the Tian-Shan, while the range of Peter I. has been further explored by M. V. Th. Novitzkiy. The botanist, M. J. N. Voronoff, explored north-western Mongolia, M. N. B. Grinevetskiy the flora of Transcaucasia, V. A. Faussek the Transcaspien fauna, and V. E. Petersen the Lepidoptera of the Urals. A journey in the Pechora region, by P. P. Mataftin, is also worthy of notice. Several expeditions—Dr. Zarudnyi in Persia, Syeroshevskiy, explorer of the Ainos, in Yezo, Karskiy in White Russia—were at work during the same year, as also the committee for the scientific collection of folk-songs, with their music.

At the meeting of the Institution of Civil Engineers held on January 10 Sir William White, K.C.B., delivered an address on the recent visit of the institution to the United States and Canada. He described the visits made to the principal engineering works in New York City and district, to those in Canada, and to similar enterprises in Chicago. In Canada, many opportunities were afforded to see examples of the utilisation of water power, and no one could fail to realise the enormous possibilities of development in the pulp and paper industry, with cheap power and a good supply of labour. The visitors were informed that

within a few miles of Ottawa there is 200,000 h.p. of water power, and within a radius of forty-five miles nearly a million horse-power. At Niagara on the Canadian side three new undertakings are being rapidly advanced, together giving more than 400,000 h.p., while a fourth will yield 40,000 h.p. When these are completed the grand total of power derived from Niagara on both sides of the river will be about 700,000 h.p. These particulars were followed in the address by an account of the International Engineering Congress at St. Louis organised by the American Society of Civil Engineers. Concluding, Sir William remarked that there can be no doubt but this visit enabled American and Canadian engineers to give practical proof of their fellowship with British engineers. The visit must tend to strengthen the friendly feeling already existing between the United States and the British Empire. It must result also in a better understanding between the mother-country and Canada.

A VALUABLE report by Dr. Musgrave and Mr. Clegg on pathogenic amœbæ, the cultivation of amœbæ, and amœbic dysentery, has been issued by the Bureau of Government Laboratories, Manila (No. 18, 1904). It is considered that all amœbæ are, or may become, pathogenic. Pure cultures of amœbæ were obtained by a modified plate culture method, but it was not found possible to cultivate the organisms unless bacteria were present in the cultivations, and the amœbæ were often found to exhibit a preference for certain species of bacteria.

THE United States Department of Agriculture has added to its valuable memoirs on food and diet a report by Messrs. Woods and Mansfield on the food of the Maine lumbermen (*Bulletin* No. 149, 1904). These men perform hard manual labour, and are much exposed to cold, wet, and hardship, and the staple daily fare consists of pork or beef, sour dough biscuits made of dough which undergoes fermentation with a "wild" yeast, tea and molasses, and beans which are first parboiled in the forenoon, and are then packed with alternate layers of salt pork in a pot which is covered with hot ashes and earth, and allowed to cook over night. It is considered that the dietary, as regards protein and energy, is the highest yet recorded for any American labouring men, is well digested, and costs about 23.5 cents per person per diem.

WE have received a copy of the third and final part of a "Catalogue of Canadian Birds," by Mr. J. Macoun, issued by the Geological Society of Canada, which deals with such families of the Passeres as were not included in the preceding part. Owing to the fuller knowledge of the habits of most of the birds recorded in this part, as compared with those in its predecessors, a larger amount of space is devoted to the majority of the species, thereby enhancing the value of the work. Otherwise the method of treatment is the same as that adopted in parts i. and ii., which have been previously noticed in our columns.

In the eighteenth annual report of the Liverpool Marine Biology Committee, dealing with the new biological station at Port Erin, Isle of Man, the director deplores that while there have been more students than in any previous year (who have worked harder than their predecessors) and more investigators engaged on original work, to say nothing of the success of the public meetings and the excellent result of the fish-hatching, yet the number of subscribers does not increase; and, in truth, the list of subscriptions to such an admirable institution is but a pitiful one—a total of 89l. 3s. 6d. The marvel, indeed, is how so much good work is accomplished and the establishment kept in going

order on an income of 176*l.* 14*s.* 1*d.* Apparently, however, there must be some other fund for the up-keep of the building, as there are no items in the account for caretaker's wages or for repairs. The committee has been unfortunate in losing several influential friends and supporters, among them Dr. Isaac Roberts, during the past year, and regret is expressed that it becomes increasingly difficult to find men of the same stamp among the younger generation to fill their places. The report is illustrated with figures of the early stages of the development of the lobster and of the plaice. Although plaice-hatching was fairly successful, results were by no means so good as regards the rearing of lobsters. After one failure 5000 larvæ were successfully hatched; but of these, despite every care, very few attained the "lobsterling" stage. It is incidentally recorded that the female spiny lobster (*Palinurus vulgaris*) destroys her eggs in captivity. The general interest of the report is much enhanced by an illustrated account of Manx (or "Manks") antiquities, inclusive of fossil mammals, by Messrs. Kermodé and Herdman.

IN the *Sitzungsberichte*, No. 22, of the Imperial Academy of Sciences in Vienna, Mr. J. Dörfner gives an itinerary of a six months' tour in the island of Crete, undertaken for the purpose of collecting botanical specimens. From this point of view the journey was very successful, as 1200 plants were obtained, including *Triadenia Sieberi*, *Senecio gnaphalodes*, and the tiny *Bellium minutum*.

Two rare seaweeds, *Rhipidosiphon* and *Callipsigma*, both referred to the *Codiaceæ*, form the subject of a short article contributed by Mr. and Mrs. A. Gepp to the *Journal of Botany* (December, 1904), and Mr. Salmon presents a second instalment of his notes on Limonium. The second supplement (1898-1902) to the biographical index of British and Irish botanists, compiled by Mr. J. Britten and Mr. C. S. Boulger, is concluded in the same number.

IN addition to the maintenance of the more ornamental gardens, the director of the Public Gardens, Jamaica, in his report for the year 1903-4, describes a number of experiments which have been carried on at the Hope Experiment Station. With the view of combining the good qualities of different varieties of pineapples, a number of hybrid seedlings have been raised by crossing the Cayenne, Ripley, and Queen varieties. The method of growing Sumatra wrapper-tobacco under tent-cloth, as practised in the Connecticut valley in America, was tried with good results, but the climate at Hope was found to be too dry for curing the leaf satisfactorily. Considerable success has attended the budding of mango, nutmeg, cocoa, and other trees, and the process is strongly recommended, both as a means of rapid propagation and also with the object of improving the fruit.

WE have received a further instalment of the States gazetteers, already noticed, in the "Gazetteer of West Virginia," by Mr. Henry Gannett, published by the United States Geological Survey.

THE August and September (1904) numbers of the *Bollettino* of the Italian Geographical Society contain an extremely interesting and suggestive memoir by Prof. Gustavo Coen on the supposed decadence of Great Britain and the awakening of eastern Asia. The conclusions of the paper, which cannot be briefly summarised, are obviously the result of wide study and research, and should be of great value to geographical and political students in this country.

IN a paper published recently in the Hungarian *Mathematischen und naturwissenschaftlichen Berichte* Dr. von Kalecsinszky gives an account of further observations and

experiments on the warming of different layers of liquid by the sun's rays. Observations in lakes in which salt water is covered over with a stratum of fresh water show that the salt water may be warmed to a much higher temperature than the overlying fresh water. Experiments with solutions of magnesium sulphate, sodium sulphate, ammonium chloride, and sodium carbonate, and with fresh water covered with petroleum and with olive oil, gave similar results. It is concluded that the phenomenon is of general occurrence, and that it is a factor of geological importance in the formation of certain deposits.

THE United States Weather Bureau has reprinted Mr. W. L. Moore's article on climate, written for the "Encyclopedia Americana," as No. 34 of its *Bulletins*. It embraces only thirteen pages of large octavo size, and is written in clear, simple language that can be understood by all. It contains in this small space a large amount of useful information relating to the effects of solar energy, distribution of land and water, and mountain ranges. With regard to secular variations, the author is of opinion that there has been no appreciable change in the climate of any large area within the period covered by authentic history.

WE have received from the observatory of the University of Odessa a copy of its *Annals* for the years 1901-3. The observatory having then completed the tenth year of its existence, the volume in question includes, in addition to observations taken thrice daily, and the monthly and yearly results for 1901-3, a valuable series of means for the ten years 1894-1903. The observatory is situated in latitude 46° 26' N.; the mean temperature is given as 28° 8 in January and 72° 1 in July. The absolute maximum was 94° 3, and the minimum -10° 3 F.; the temperature of the ground is observed at various depths. The annual rainfall is only 13 inches; the wettest month is June (2.3 inches).

WE have received a copy of the report of the International Meteorological Committee's meeting at Southport in September, 1903. The meeting was well attended, and various subjects of interest were discussed, including the valuable reports by subcommittees and by individuals; these reports are printed *in extenso* in the appendix. Five of them refer to the arrangements existing or proposed for the exploration of the upper air by means of balloons and kites, and to the results hitherto obtained. Much credit is due to M. Teisserenc de Bort, who, in addition to the stations he has established at Trappes and Itteville, near Paris, has been chiefly instrumental in establishing similar stations at Moscow and Viborg (Denmark). This latter enterprise is acknowledged to be a most important contribution to meteorological science. Appendix vii. is a very valuable report by Sir Norman Lockyer on simultaneous solar and terrestrial changes, which may have an important influence on the meteorology of the future. After summarising the investigations made from earliest times, he points out the considerable advances made during the last quarter of a century. Among the other appendices we may specially mention two by Prof. Pernter (chief of the Austrian Meteorological Service) and by M. Rykatcheff (director of the Russian Service) on the use of the hair hygrometer instead of the wet-bulb thermometer. This instrument is found to be of much service in times of severe frost. M. J. Violle contributes a valuable report on radiation. The author points out that the question is exceedingly complex, and demands a complete study of each of the simple radiations which go to make up the total solar radiation. The International Meteorological Committee voted for the convening of a conference of all directors of meteorological offices, to be held at Innsbruck in September, 1905.

MESSRS. J. J. GRIFFIN AND SONS have sent us specimens of "Vitro-Ink," which is a non-corrosive ink for writing on glass, celluloid, wood, or other material. The ink may be used with an ordinary pen, and flows quite readily. A useful property is that it may be completely removed by means of a damp cloth at any time before it has set hard, so that mistakes can be rectified without difficulty. The ink will be found of especial service in labelling such things as laboratory or photographic dark room bottles, where labels of ordinary type quickly become discoloured or worn away. When written on with vitro-ink the inscriptions entirely resist strong acids, and it is only prolonged action of strong alkalis or boiling water which may efface the material. Microscopic slides, lantern slides, and glass or celluloid photographic negatives may be labelled and numbered direct, and as the ink is quite unaffected by alcohol it can also be employed for biological or other specimens which it may be necessary to preserve in spirit. Another useful field for this ink will be in the rapid production of diagrammatic lantern slides for class or lecture illustration, as the design may be drawn direct on the glass during actual projection, thereby placing considerable facilities in the hands of lecturers or others desiring to employ the screen in place of a blackboard or prepared wall diagrams. The ink can be especially recommended to photographers as an efficient labelling agent, showing good contrast in the dark room light, and capable of being washed clean instantly whenever the names become stained from the unavoidable oxidation of the various solutions employed.

MR. A. HENRY SAVAGE LANDOR'S new book, "Tibet and Nepal," will be published within the next few days by Messrs. A. and C. Black.

MESSRS. GEORGE BELL AND SONS have published a teacher's edition of part i. of "Elementary Algebra," by Messrs. W. M. Baker and A. A. Bourne. The arrangement by which the answers are printed on the page opposite to the examples which are to be given to pupils to work out should prove convenient for the teacher during class work.

### OUR ASTRONOMICAL COLUMN.

DISCOVERY OF A SIXTH SATELLITE TO JUPITER.—A telegram received from the Kiel Centralstelle announces the discovery of a sixth satellite to Jupiter by Prof. Perrine. The existence of the object was suspected in December, 1904, and was confirmed by an observation made on January 4. The position angle on that date was  $269^\circ$ , and its distance from the planet  $45''$ , the latter quantity decreasing  $45''$  daily, whilst the apparent motion was retrograde.

A later communication from Kiel states that the discovery was made with the Crossley reflector, observations of the satellite having been made on December 3, 8, 9, and 10, 1904, and January 2, 3, and 4.

COMET 1904 d (GIACOBINI).—Another set of elements and an ephemeris for comet 1904 d have been calculated by Herr M. Ebell from positions determined on December 17, 21, and 26, 1904, and are given below.

#### Elements.

$T = 1904 \text{ November } 4^{\text{h}} 22^{\text{m}}$  (Berlin)

$$\begin{aligned} \infty &= 41 \ 15'6'' \\ \delta &= 218 \ 32'0'' \\ i &= 99 \ 39'1'' \end{aligned} \left. \vphantom{\begin{aligned} \infty \\ \delta \\ i \end{aligned}} \right\} 1904.0$$

$$\log q = 0.27536$$

#### Ephemeris (12h. Berlin).

1905	$\alpha$			$\delta$	$\log \Delta$			Bright-
	h.	m.	s.	'				ness
Jan. 12 ...	17	29	10	...	+40	37	...	0.3451 ... 1.01
" 14 ...	17	36	1	...	+41	42	...	
" 16 ..	17	43	2	...	+42	47	...	0.3438 ... 1.00

(Kiel Circular, No. 71).

ELEMENTS AND EPHEMERIS FOR COMET 1904 e.—The following elements and ephemeris for Borrelly's comet (1904 e) have been calculated by Dr. Elis Strömgren from the positions determined on December 31, 1904, January 1 and 2 :—

#### Elements.

$T = 1905 \text{ January } 1^{\text{h}} 27^{\text{m}} 10^{\text{s}}$  (Berlin).

$$\begin{aligned} \infty &= 341 \ 23'22'' \\ \delta &= 69 \ 54'82'' \\ i &= 35 \ 30'70'' \end{aligned} \left. \vphantom{\begin{aligned} \infty \\ \delta \\ i \end{aligned}} \right\} 1905.0$$

$$\log q = 0.19344$$

#### Ephemeris 12h. (Berlin).

1905	$\alpha$			$\delta$	$\log \Delta$			Bright-
	h.	m.	s.	'				ness
Jan. 12 ...	1	33	39	...	+1	17.4	...	0.0870 ... 0.83
" 16 ...	1	40	8	...	+4	18.7	...	0.0985 ... 0.78
" 20 ...	1	46	56	...	+7	13.6	...	0.1107 ... 0.73

Brightness at time of discovery = 1.0.

According to the above the comet will pass through the south-eastern corner of the constellation Pisces into Aries, and will be about twenty-five minutes west of  $\alpha$  Piscium on January 12 (Kiel Circular, No. 72).

COLOURS OF STARS IN THE SOUTHERN HEMISPHERE.—During the period October, 1903–March, 1904, Dr. J. Möller, whilst cruising in the tropical regions of the Atlantic and Pacific Oceans, made a number of observations of the colours of 169 stars situated between declination  $-20^\circ$  and the South Pole, all of which were about magnitude 3.5.

The results of these observations are published in No. 3980 of the *Astronomische Nachrichten*, where the observer also shows the reduction of his colour values to Osthoff's scale and the differences between his own results and those obtained by the latter observer.

"THE HEAVENS AT A GLANCE."—The handy card calendar, "The Heavens at a Glance," published by Mr. Arthur Mee, Llanishen, price sevenpence, post free, is full of useful information for amateur astronomers. Among other things it contains a "celestial diary" which gives all the more important astronomical events during each month, a table showing the elements of the sun and planets, and a mass of information relative to the brighter stars, variable and double stars, and star clusters and nebulae.

Intended to hang on the observatory wall, the calendar forms a most useful adjunct to the more voluminous almanacs which it epitomises.

#### ASTRONOMICAL "ANNUARIO" OF THE TURIN OBSERVATORY.

—The first annual publication of the Turin Observatory appeared in the year 1787, but for various reasons their appearance has not been continuous. A new series commences with the "Annuario" for the present year, and in the preface Signor Boccardi, the director, explains its *raison d'être* by the statement that it does not contain the ephemerides, star-places, &c., published in the larger national almanacs, but deals more especially with the calculations and researches made at the Turin Observatory, and fills up the gaps left by those almanacs.

As examples of this we may mention the tables which contain the mean positions and the apparent positions at upper culmination (Greenwich meridian) of 202 stars not included in the "Nautical Almanac," the "American Ephemeris," or the "Connaissance des Temps." The heliocentric coordinates of Jupiter and Saturn (for 1905 and 1906), the elements and ephemerides of various minor planets, a mass of meteorological data, and a review of the meteorology of 1903 are also given.

ORIGIN OF LUNAR FORMATIONS.—In a paper on "A Possible Explanation of the Formation of the Moon," read before the Royal Society of Edinburgh on November 21, 1904 (see NATURE, December 8, 1904, p. 143), Mr. G. Romanes showed that there had never been sufficient heat developed in the interior of the moon by gravitational compression to account for volcanic action on its surface; and he explained how lunar markings could be accounted for on his hypothesis by the impact of meteoritic masses. Dr. Johnston-Lavis writes to say he has long held this view, and reminds us that Dr. G. K. Gilbert developed the impact theory of the formation of lunar craters several years ago (see Bull. Phil. Soc. of Washington, vol. xii., pp. 241–292, and NATURE, vol. xlvi., p. 82, May 23, 1893).